REMARKS

This Amendment is fully responsive to the Office Action mailed May 11, 2009. It is respectfully submitted that the claims contain limitations that patentably define over the references cited by the Examiner, for the reasons discussed in these remarks. Therefore, reconsideration and allowance of the pending claims is appropriate and respectfully requested.

Objection to Drawings

The Office Action (§ 3) objects to Figures 2 and 4 on the basis that boxes 23, 27 and 152 are not labeled with words. Replacement drawing sheets 2 and 4 are submitted herewith to overcome this objection. The only change in the replacement drawing sheets versus the original drawing sheets is that words have been added in boxes 23, 27 and 152.

Amendments to Specification

The Office Action (§ 4) objects to the specification for omitting section headings. The specification is amended herein to overcome this objection by adding section headings. Other changes to the specification are also made.

Objection to Claim 11

The Office Action (§ 5) objects to claim 11 due to the phrase "use of containers." Claim 11 has been amended to overcome this objection.

Rejections of Claims 1 - 7 Based In Part on Baker, Giesler and Jackson

The Office Action (§ 10) rejects claims 1-4 and 7 under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 6,628,981 to Baker et al. (hereafter "Baker"), in view of "Noninvasive Visualization of Coronary Arteries Using Contrast-Enhanced Multidetector CT" to Giesler et al. (hereafter "Giesler"), and in further view of U.S. Patent No. 6,475,148 to Jackson et al. (hereafter "Jackson"). Moreover, the Office Action (§§ 11-12) rejects dependent claims 5 and 6 under 35 U.S.C. § 103(a) as unpatentable over Baker, Giesler and Jackson, and further in view of additional secondary references. These rejections of claims 1-7 are each based in part upon the conclusion that the parent independent claim 1 is unpatentable as obvious over Baker in view of Giesler and additionally in view of Jackson. It is requested that these rejections be reconsidered and withdrawn, because none of the cited references discloses monitoring the heart beat rate of a patient during a CT

scan and rupturing a drug container on the basis of the monitored heart beat rate, as recited in claim 1.

The Office Action (§ 10 ¶ 2) concludes: "*Baker et al* discloses imaging a patient during a CT scan (Fig. 1), monitoring the heart beat rate of the patient (EKG 46, Fig. 2), and correlating the imaging procedure with the heart beat rate of the patient (Sync Unit 48, Fig. 2)." The applicants respectfully disagree with that reading of Baker. Baker does not disclose "monitoring a heart beat rate of the patient" during a CT scan, nor does Baker disclose correlating an imaging procedure "on the basis of the monitored heart beat rate," as recited in claim 1. Rather, Baker discloses using an EKG 46 and associated SYNC unit 48 during a CT scan to determine whether the heart is in the systole phase or the diastole phase of the cardiac cycle, or the point in time when such phases begin (Baker, col. 2, lines 1-18 and col. 4, lines 1-15). The signal from the SYNC unit 48 in Baker enables an x-ray controller 32 to synchronize x-ray production during a selected portion of the cardiac cycle (Baker, col. 4, lines 26-38). Baker discloses that, advantageously, x-ray attenuation data is collected during a resting period within the cardiac cycle, typically corresponding to the diastole phase (Baker, col. 2, lines 7-18 and col. 4, lines 39-44).

Thus Baker operates on the basis of the patient's cardiac cycle, not on the basis of a monitored heart beat rate, during the CT imaging scan. The patient's heart beat rate during the CT scan, as measured for example in beats per minute, does not determine or affect any imaging procedure applied in Baker. Rather, Baker discloses attempting to determine the phase of the patient's cardiac cycle during the CT imaging scan, and then acting on that basis, regardless of how fast the heart is actually beating. Thus, for example, the SYNC unit 48 in Baker may activate x-ray emission after delaying a selected period of time from commencement of the cardiac cycle (Baker, col. 4, lines 34-38) — regardless of whether the heart is beating quickly or slowly and independently of the heart beat rate. So Baker does not disclose monitoring the heart beat rate of a patient during a CT scan and rupturing a drug container "on the basis of the monitored heart beat rate" — or doing anything else on the basis of a monitored heart beat rate during a CT scan — as recited in claim 1.

Indeed, to the extent a patient's heart beat rate plays any role at all in Baker, that role is pre-determined before the CT imaging scan is begun based on a predicted heart rate with a predicted range. Baker discloses that "an accurate prediction must be made of the patient's initial heart rate

and the range of heart rate variation which will occur during the cardiac scan" (Baker, col. 4, line 45 to col. 5, line 9; see also Baker, col. 5, line 55 to col. 6, line 26). Then, based on "monitoring the heart rate variation during pre-scan conditions, and applying the cardiac observations to a database of cardiac activity observations from a large population of patients", Baker determines "a transfer function that relates a patient's characteristics to a heart rate which likely will occur during an imaging procedure" (id.). "Before the start of the actual imaging scan, the predicted heart rate is used to set the scan parameters" (id.). Thus it is clear that Baker does not disclose monitoring a heart beat rate during a CT imaging scan, or correlating an imaging procedure on the basis of the monitored hear beat rate, as recited in claim 1.

Turning to Giesler, like Baker it does not disclose either "monitoring a heart beat rate of the patient during the CT scan" or rupturing a drug container "on the basis of the monitored heart beat rate," as recited in claim 1. Giesler studies the influence of heart rate on the presence of motion artifacts and on accuracy in detecting coronary artery stenoses (Giesler, page 1, col. 1 to col. 2). Giesler ultimately concludes "a useful approach might be to limit the use of MDCT [multidetector CT] for coronary artery visualization to patients with lower heart rates or to use pharmacologic interventions (e.g., β-blockers) during the scanning to enhance image quality and accuracy in the identification of coronary stenoses" (Giesler, page 914, col. 3). Thus, at most, Giesler discloses giving the patient a drug before the CT imaging scan begins to lower a patient's heart beat rate and thereby reduce motion artifacts. Giesler does not disclose monitoring a heart beat rate of the patient during the CT scan, or applying a drug on the basis of the monitored heart beat rate, as recited in claim 1.

As to Jackson, like Baker and Giesler it does not disclose "monitoring a heart beat rate of the patient during the CT scan" or rupturing a drug container "on the basis of the monitored heart beat rate," as recited in claim 1. Jackson discloses a method and system for delivering drugs carried by microspheres, using an ultrasound system to destroy the microspheres in a specific localized area or at a specific time (Jackson, col. 1, lines 28-35). Concerning the timing aspect of Jackson, a trigger may respond to a heart or breathing cycle (Jackson, col. 1, lines 44-48 and col. 3, lines 39-51). For example, the user may identify a time or time window within the cardiac cycle to apply the drug, such as end diastole for myocardial therapy (Jackson, col. 7, lines 25-39).

However, Jackson does not disclose using any of its method and system during a CT imaging scan. Moreover, much like Baker, the trigger / synchronization disclosed in Jackson correlates to a specific point or points in the cardiac cycle, not a monitored heart beat rate as claimed. Thus Jackson does not disclose monitoring a heart beat rate, or taking any action on the basis of a monitored hear beat rate, during a CT scan as recited in claim 1.

Thus, there is no disclosure in any one of Baker, Giesler or Jackson of "monitoring a heart beat rate of the patient during the CT scan" or rupturing a drug container "on the basis of the monitored heart beat rate," as recited in claim 1. For at least that reason, the rejections of claims 1 to 7 should be reconsidered and withdrawn.

Rejections of Claims 8 - 9 Based In Part on Baker, Giesler and Jackson

The Office Action (§ 10) rejects claims 8-9 under 35 U.S.C. § 103(a) as unpatentable over Baker, in view of Giesler, and in further view of Jackson. It is requested that these rejections be reconsidered and withdrawn, because none of the cited references discloses monitoring the heart beat rate of a patient during a CT scan or rupturing a drug container on the basis of the monitored heart beat rate, as recited in claim 8. This is established in the discussion above concerning claims 1-7.

Rejections of Claims 10 - 11 Based On Jackson

The Office Action (§ 7) rejects independent claims 10 and 11 under 35 U.S.C. § 102(b) as anticipated by Jackson. It is requested that these rejections be reconsidered and withdrawn. Jackson does not disclose evaluating the heart beat rate of a patient during a CT scan or triggering a rupturing of a drug container on the basis of the evaluation of the heart beat rate, as recited in claim 10. Nor does Jackson disclose rupturing containers in response to a monitored blood flow rate as recited in claim 11. This is established in the discussion above concerning claims 1-7.

New Claims 12 to 17

New dependent claims 12 to 17 have been added herein. It is respectfully submitted that they are allowable over the art of record.

Conclusion

This Amendment is fully responsive to the Office Action mailed May 11, 2009. It is respectfully submitted that the claims contain limitations that patentably define over the references cited by the Examiner, for the reasons provided in the remarks above. Therefore, reconsideration and allowance of the pending claims is appropriate and respectfully requested.

Respectfully submitted,

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